

REMARKS

Claims 13 and 26 have been amended in the present response. Claims 13-20 and 25-32 remain pending in the case. Further examination and reconsideration of the presently claimed application are respectfully requested.

Section 103 Rejection

Claims 13-20, 25, and 26 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application No. 2003/0235983 to Li et al. (hereinafter referred to as “Li”) in view of U.S. Patent No. 5,741,362 to Kobayashi (hereinafter “Kobayashi”), U.S. Patent No. 5,636,762 to Juhola et al. (hereinafter “Juhola”) and optionally U.S. Patent No. 5,368,715 to Hurley (hereinafter “Hurley”). Claims 27-31 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Li and Kobayashi in view of U.S. Patent No. 5,830,805 to Shacham-Diamand et al. (hereinafter “Shacham-Diamand”). Claim 32 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Li, Kobayashi, Shacham-Diamand and Juhola.

To establish a case of *prima facie* obviousness of a claimed invention, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. Second, there must be a reasonable expectation of success. As stated in MPEP 2143.01, the fact that references can be hypothetically combined or modified is not sufficient to establish a *prima facie* case of obviousness. See *In re Mills*, 916 F.2d. 680 (Fed. Cir. 1990). Finally, the prior art references must teach or suggest all the claim limitations. *In re Royka*, 490 F.2d. 981 (CCPA 1974); MPEP 2143.03 (emphasis added). Specifically, “all words in a claim must be considered when judging the patentability of that claim against the prior art.” *In re Wilson* 424 F.2d. 1382 (CCPA 1970). Using these standards, Applicants contend that the cited art fails to provide teaching or suggestion for all features of the currently pending claims, and furthermore, cannot be combined or modified to do so. Several distinctive features of the present invention are set forth in more detail below.

None of the cited art, either alone or in combination, provides teaching, suggestion or motivation for a system comprising a chamber and a plurality of tanks, wherein one tank of the plurality of tanks comprises a larger volume capacity than the chamber and a smaller volume capacity than another tank of the plurality of tanks. Amended independent claim 13 recites in part:

A system, comprising: a chamber configured to process one or more wafers for the fabrication of microelectronic devices; a plurality of tanks serially coupled to the chamber and adapted to store a process fluid used to treat the wafers, wherein one tank of the plurality of tanks comprises a larger volume capacity than the chamber and a smaller volume capacity than another tank of the plurality of tanks...

Support for the amendments made to claim 13 may be found within originally filed claim 26. As such, the amendments made herein do not introduce new matter. As described in more detail below, Li, Kobayashi, Juhola, and Hurley each fail to teach or suggest, and cannot be combined or modified to teach or suggest, all limitations of present claim 13.

Li discloses an electroless plating system including a processing chamber (plating chamber 120) and a plurality of tanks (pre-heat tank 110 and holding tank 100) (Li -- Fig. 1). However, Li fails to provide teaching, suggestion or motivation for one of the plurality of tanks having a larger volume capacity than the chamber and a smaller volume capacity than another of the plurality of tanks. Although Li suggests that plating chamber 120 may be smaller than holding tank 100, Li explicitly teaches that plating chamber 120 is about the same size as pre-heating tank 110 (Li -- ¶¶ 0044, 0046).

The Examiner appears to agree that teaching or suggestion for the claimed differences in volume capacity cannot be found within Li. For example, the Examiner admits that although Li mentions one tank (e.g., the holding tank 100) having a larger volume capacity, Li teaches “the intermediate tank and plating chamber having the same capacity” (Office Action -- p. 6). As a consequence, Li cannot be relied upon to provide teaching or suggestion for all limitations of the present claim, which require one of the plurality of tanks to have a larger volume capacity than the chamber and a smaller volume capacity than another of the plurality of tanks.

In addition to explicit lack of teaching or suggestion, Li lacks the necessary motivation that would enable one skilled in the art to modify the teachings of Li to provide the claimed differences in volume capacity. First of all, Li explicitly teaches that pre-heat tank 110 has a volume capacity similar to that of plating chamber 120. Second, Li fails to teach, suggest, or provide desirability for a tank (e.g., pre-heat tank 110), which has a larger volume capacity than the chamber (e.g., plating chamber 120) and a smaller volume capacity than another tank (e.g., holding tank 100). The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination [or modification]. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990); MPEP 2143.01. Without showing desirability for the modification, Li provides no motivation that would enable one skilled in the art to make the proposed modification.

Furthermore, the teachings of Juhola, Kobayashi, and Hurley cannot be combined with those of Li to overcome the deficiencies therein. For example, Juhola, Kobayashi, and Hurley each fail to provide teaching, suggestion, or motivation for “a plurality of tanks serially coupled to the chamber and adapted to store a process fluid used to treat the wafers, where one tank of the plurality of tanks comprises a larger volume capacity than the chamber and a smaller volume capacity than another tank of the plurality of tanks,” as presently claimed. As such, even if Juhola, Kobayashi, and Hurley were combined with Li, the combined teachings of the cited art would still fail to disclose all limitations of present claim 13.

None of the cited art, either along or in combination, provides teaching, suggestion or motivation for a system having: (i) an intermediate tank interposed between a chamber and a storage tank, and (ii) a third set of pipes configured to transport a process fluid from the chamber directly to the intermediate tank. Independent claim 27 recites in part:

A system, comprising: a chamber configured to process one or more wafers for the fabrication of microelectronic devices ... a storage tank configured to hold the process fluid; an intermediate tank interposed between the chamber and the storage tank ... and a third set of pipes configured to transport the process fluid from the chamber directly to the intermediate tank.

As described in more detail below, Li, Kobayashi Shacham-Diamand and Juhola each fail to teach or suggest, and cannot be combined or modified to teach or suggest, all limitations of present claim 27.

Li discloses an electroless plating system including a processing chamber (plating chamber 120), a storage tank (holding tank 100) configured to hold the process fluid, and an intermediate tank (pre-heat tank 110) interposed between the chamber and the storage tank (Li -- Fig. 1). However, Li fails to provide teaching, suggestion, or motivation for “a third set of pipes configured to transport the process fluid from the chamber directly to the intermediate tank,” as recited in present claim 27. Teaching, suggestion, or motivation for the presently claimed “third set of pipes” is also lacking with Kobayashi and Juhola.

The Examiner appears to agree that teaching or suggestion for the claimed “third set of pipes” cannot be found within Li. On page 7 of the Office Action, the Examiner admits that “Li does not disclose pipes configured to transport the process fluid from the chamber directly to the intermediate tank.” However, the Examiner suggests that “Shacham-Diamond [sic] discloses a pipe (pipe 124) equivalent to the third pipe, which [is] configured to transport process fluid directly from the process chamber to the intermediate or holding chamber (item 148)” (Office Action -- p. 7). Therefore, the Examiner concludes that it would have been obvious to combine the pipe 124 of Shacham-Diamand with the electroless plating system of Li “to permit recirculation of the processing fluid” (Office Action -- p. 7). The Applicants disagree. First of all, the Applicants provided strong arguments as to how Shacham-Daimand could not be combined with Li to overcome the deficiencies therein in the office action response filed January 19, 2007. The Applicant’s previous arguments are reiterated below for the Examiner’s convenience.

As shown in Fig. 3, Shacham-Diamand discloses electroless deposition apparatus 9 including processing chamber 112 used for processing a wafer and holding tank 148 used for temporarily storing the processing fluid, which is to be recirculated back to the processing chamber. Shacham-Diamand teaches that the “processing fluid enters process chamber 112 through an inlet 121. Inlet 121 connects to a spray bar 114, which disperses the fluid onto the rotating semiconductor

wafer 120 in a uniform flow. The fluid then exits process chamber 112 through an outlet 124” (Shacham-Diamand – col. 6, lines 12-27; Fig. 3).

The Examiner suggests that outlet 124 of Shacham-Diamand is somehow equivalent to the presently claimed “third set of pipes.” The Applicants disagree. As noted above, claim 27 requires that the third set of pipes be configured to transport the process fluid from the chamber directly to an intermediate tank, which is interposed between the chamber and a storage tank configured to hold the process fluid. Other than processing chamber 112, holding tank 148 shown in Fig. 3 of Shacham-Diamand is the only tank configured to hold the processing fluid. If holding tank 148 can be interpreted to read upon any of the limitations recited in claim 27, it would most accurately read upon the presently claimed “storage tank.” In other words, Shacham-Diamand fails to include an “intermediate tank” interposed, e.g., between processing chamber 112 and holding tank 148. Therefore, although outlet 124 may transport process fluid from processing chamber 112 to holding tank 148, outlet 124 cannot be considered equivalent to the presently claimed “third set of pipes,” because outlet 124 is not configured for transporting the process fluid from the processing chamber directly to an intermediate tank (which is clearly absent in the apparatus disclosed by Shacham-Diamand).

If the proposed combination were made, outlet 124 of Shacham-Diamand would (at best) enable process fluid to be transported from processing chamber 120 to holding tank 100 of Li. However, such recirculation of processing fluid is already provided by line 115 which, as shown in Fig. 1 of Li, transports processing fluid from processing chamber 120 to holding tank 100. Since neither Li nor Shacham-Diamand provide teaching, suggestion or motivation for recirculating the processing fluid from a processing chamber (e.g., chamber 120 of Li or chamber 112 of Shacham-Diamand) to an intermediate tank (e.g., pre-heat tank 110 of Li; no intermediate tank is disclosed by Shacham-Diamand), the teachings of the cited art cannot be combined or modified in a manner, which would read upon the presently claimed “third set of pipes.”

The Examiner was unconvinced by the arguments presented above. On page 9 of the current Office Action, the Examiner supports the assertion that holding tank 148 shown in Fig. 3 of Shacham-Diamond is equivalent to the presently claimed intermediate tank by broadly interpreting the “intermediate tank” as “the tank being the one immediately next to [the] chamber.” The Examiner also suggests that the claimed limitations are a recitation of intended use and do not result in a structural difference between the claimed invention and the prior art. The Applicant’s disagree on both accounts for at least the reasons set forth below.

Applicant’s realize that the claims must be interpreted as broadly as their terms reasonably allow during examination. This means that the words of the claim must be given their plain meaning unless applicant has provided a clear definition in the specification. *In re Zletz*, 893 F.2d 319, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989); MPEP 2111.01. However, Applicants contend that the Examiner has failed to examine the claim language using the plain meaning of the term “intermediate,” and, instead, has attempted to interpret the claim language more broadly than its terms reasonably allow. For example, the Examiner suggests that the term “intermediate tank” may be interpreted as “the tank being the one immediately next to [the] chamber” (Office Action -- p. 9). The Applicant’s disagree and contend that this is an overly broad and unreasonable interpretation of the claim language.

First of all, the interpretation provided by the Examiner is inconsistent with the teachings of the specification and the limitations of the claim, which clearly describe the intermediate tank as being interposed between the chamber and the storage tank. Second, the interpretation provided by the Examiner is inconsistent with the plain meaning of the term. For example, Merriam-Webster’s online dictionary defines the term “intermediate” (adjective) as “being or occurring at the middle place, stage, or degree or between extremes.” One skilled in the art would never consider holding tank 148 to be an “intermediate” tank, because tank 148 does not occur at the middle place between two extremes (such as between the presently claimed storage tank, where the temperature of the process fluid is much lower, and the presently claimed chamber, where the temperature of the process fluid is much higher). In other words, one skilled in the art would never consider a tank (e.g., holding tank 148), which is simply next to a chamber

(e.g., processing chamber 112), to be equivalent to the presently claimed “intermediate tank,” if an accurate definition of the term were used to examine the claim.

To reiterate, the system disclosed by Shacham-Diamand uses only one tank (holding tank 148) for storing process fluid and one chamber (processing chamber 112) for processing a wafer. There is absolutely no intermediate tank interposed between chamber 112 and storage tank 148 disclosed by Shacham-Diamand. By failing to disclose an intermediate tank, Shacham-Diamand fails to provide teaching or suggestion for a (third) set of pipes, which are configured to transport process fluid from the chamber directly to a (non-existent) intermediate tank. Holding tank 148 shown in Fig. 3 of Shacham-Diamand cannot be considered equivalent to the presently claimed “intermediate tank” because the holding tank fails to read on the claim language even when the plain meaning of the term is used to interpret the claim. The Examiner cannot render the claim language obvious by insisting on an overly broad and inaccurate interpretation of the term “intermediate.”

With regard to intended use, Applicant’s assert that the system recited in present claim 27 provides a structural difference between the claimed invention and the prior art by requiring that the system include a chamber, a storage tank, an intermediate tank and a network of pipes for transporting processing fluids between the tanks in the manner claimed. Contrary to the presently claimed case, the cited art fails to provide teaching, suggestion or motivation for a (third) set of pipes, which are arranged within the system to transport process fluid from the chamber directly to an intermediate tank. Although the systems disclosed by Li and Shacham-Diamand each include pipes (e.g., pipe 115, Li; pipe 124, Shacham-Diamand) for transporting unused process fluid from the chamber (e.g., chamber 120, Li; chamber 112, Shacham-Diamand) to the storage tank (e.g., tank 100, Li; tank 148, Shacham-Diamand), the systems disclosed by Li and Shacham-Diamand each fail to include an additional set of pipes for transporting the process fluid from the chamber directly to the intermediate tank. The absence of such pipes prevents the prior art systems from transporting process fluid from a chamber to an intermediate tank and represents at least one structural difference between the prior art and the presently claimed case.

Applicants have shown that the cited references each fail to provide teaching or suggestion for all limitations of present independent claims 13 and 27. Accordingly, Applicants believe claims 13 and 27, as well as all claims dependent therefrom, are patentably distinct over the cited references. Therefore, Applicants respectfully request removal of this rejection.

CONCLUSION

This response constitutes a complete response to all of the issues raised in the Office Action mailed June 14, 2007. In view of the remarks herein, Applicants assert that pending claims 13-20 and 25-32 are in condition for allowance. If the Examiner has any questions, comments, or suggestions, the undersigned earnestly requests a telephone conference.

No fees are required for filing this amendment; however, the Commissioner is authorized to charge any additional fees, which may be required, or credit any overpayment, to Daffer McDaniel LLP Deposit Account No. 50-3268.

Respectfully submitted,

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